

REMARKS

No claims have been amended. Accordingly, no listing of claims is required. Claims 9-26 are pending.

Claims 9-10, 15-22, 24, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Merrill (U.S. Patent No. 5,892,541) in view of Fossum (U.S. Patent No. 5,665,959) and Gray (U.S. Patent No. 5,856,829). Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Merrill in view of Fossum, Gray, and Mandl (U.S. Patent No. 5,248,971). Claims 12-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Merrill in view of Fossum, Gray, and Lee (U.S. Patent No. 6,466,265). Claims 23 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Merrill in view of Fossum, Gray, and Berger (U.S. Patent No. 4,453,177). These rejections are respectfully traversed.

Claims 9 and 21, recite, *inter alia*, "wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in one of said digital memory arrays."

Claim 18, recites, *inter alia*, "sampling and converting said analog image information for a first pixel of said active pixel image sensor array plurality of times during a desired integration period to produce a first plurality of digital values; storing said first plurality of digital values in a first digital memory."

The above recited portions of the independent claims therefore require sampling pixel output multiple times during an integration period and storing each sampled value.

Merrill is directed to a method and system for increasing the dynamic range response of an imaging system. Merrill discloses that during a pixel's integration

period, the pixel be repeatedly read. If the read value exceeds a predetermined threshold, that value is further processed and the pixel reset. If the read value does not exceed the predetermined threshold, that value is unused and the pixel is permitted to continue to integrate pending the next reading. In this manner, Merrill can increase the dynamic range by preventing the pixel from saturating.

Because Merrill discloses that if the read value does not exceed the predetermined value, the pixel is permitted to continue to integrate, and because in such an instance, the read value is not stored or accumulated, Merrill clearly does not disclose or suggest the above quoted portions of the independent claims. More specifically, Merrill fails to disclose or suggest “wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in one of said digital memory arrays” (as required by claims 9 and 21) or “sampling and converting said analog image information for a first pixel of said active pixel image sensor array plurality of times during a desired integration period to produce a first plurality of digital values; storing said first plurality of digital values in a first digital memory” (as required by claim 18).

The Office Action argues that Merrill states that “any value can be used as the predetermined value” and that if the predetermined value is set to be zero, then every read value will be used. This conclusion is in error. Although Merrill does in fact contained the stated quotation, it is clear from the specification as a whole that the increase in dynamic range is achieved by preventing pixel saturation on an as-needed basis by accumulating partial integration values in instances where full integration may result in pixel saturation. For example, the Abstract states: “[e]ach time a cell is read, the number of photons collected by the cell is saved and the cell is reset if the cell would normally saturate by the end of the integration period. At the end of the integration period, the number of photons collected by each cell is defined by the sum of values

collected during the integration period.” If the predetermined value were set to be zero, the pixel would be reset even when there is no danger of saturation. Accordingly, while the Office Action correctly quoted Merrill, the reference cannot be fairly characterized in the manner suggested in the Office Action. The quoted passage of Merrill is only meant to suggest that the predetermined value can be varied from the half saturation level used in one embodiment of Merrill. Implicit in the statement is that the predetermined value can be changed, but only in a manner which preserves the functionality disclosed by Merrill, which is only possible using a non-zero value for the predetermined value.

For these reason, Merrill cannot be said to disclose or suggest the above quoted limitations of the independent claims.

Fossum discloses a solid state image sensor. The Office Action cites to Fossum for its disclosure that a solid state image sensor can be formed upon a single substrate. However, Fossum, like Merrill, also fails to disclose or suggest the multiple sampling technique recited in the above quoted portions of independent claims 9, 18, and 21. Thus, Fossum, whether taken singly or in combination with Merrill, cannot be said to disclose or suggest the above quoted limitations of the independent claims.

Gray discloses a real time graphical rendering system which includes a triangle-engine. The Office Action cites to Gray for its disclosure that alternating data may be written faster if written to alternating memory devices. It should be noted that the requirements for a graphical rendering system is very different from an image sensor. Further, Gray, like Fossum, and Merrill, fails to disclose or suggest the multiple sampling technique recited in the above quoted portions of independent claims 9, 18, and 21. Thus, Gray, whether taken singly, or in combination with Merrill and/or

Fossum, cannot be said to disclose or suggest the above quoted limitations of the independent claims.

The Office Action additionally cites to Mandl, Lee, and Berger. However, these references also do not disclose or suggest, whether individually, or in combination, the above recited features of the independent claims. Moreover, there is no motivation within the references to combine their teachings in a meaningful way to attain the claimed invention. Only Applicant's claims provide such motivation in a hindsight reconstruction of the invention.

Accordingly, independent claims 9, 18, and 21 are believed to be allowable. The depending claims, i.e., claims 10-17, 19-20, 22, 24-26 are also believed to be allowable for at least the same reasons as the independent claims.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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